Soil name: Rosemarkie

Overview

Rosemarkie soils occupy about 40 ha on rolling and hilly slopes east of the Mataura River below Gore. These soils also occur on areas outside the Topoclimate survey area. They occur in upland areas above about 300m altitude, and are formed into deep loess. Soils are well drained, with a deep rooting depth and high plant available water capacity, and are strongly leached. Present use is pastoral farming with sheep and beef cattle. Climate is cool with long winters. Regular rainfall occurs and soils seldom dry out.

Soil classification

NZ Soil Classification (NZSC): Acidic Allophanic Brown; stoneless; clayey over silty
Previous NZ Genetic Classification: Very strongly leached upland yellow-brown earth

Classification explanation

The NZSC of Rosemarkie soils is consistent with the previous classification. They are strongly leached soils with yellow-brown colours, P-retention of >85% and pH of less than 5.5 in the subsoil. Rosemarkie soils are typically stonefree, with silty clay textures grading to silt loam in the subsoil.

Soil phases and variants

Identified units in the Rosemarkie soils are:

- Rosemarkie rolling deep (RoR1): has no gravel within 90cm depth; occurs on slopes of 7–15°
- Rosemarkie hilly deep (RoH1): Has no gravel within 90cm depth; occurs on slopes of 15–25°

The soil properties described in this Technical Data Sheet are based on the most common phase, Rosemarkie rolling deep (RoR1). Values for other phases and variants can be taken as being similar. Where they differ significantly they are recorded with a separate versatility rating, e.g., Rosemarkie hilly deep (RoH1).

Associated soils

Some soils that commonly occur in association with Rosemarkie soils are:

- Kaiwera: strongly leached soil formed in shallow gravelly colluvium, below 300m altitude
- Venlaw: very strongly leached soil formed in shallow gravelly colluvium, above 300m altitude
- Pukerau: strongly leached soil forming onto bedrock within 45cm depth
- Waiarikiki: strongly leached soil formed in moderately deep gravelly colluvium

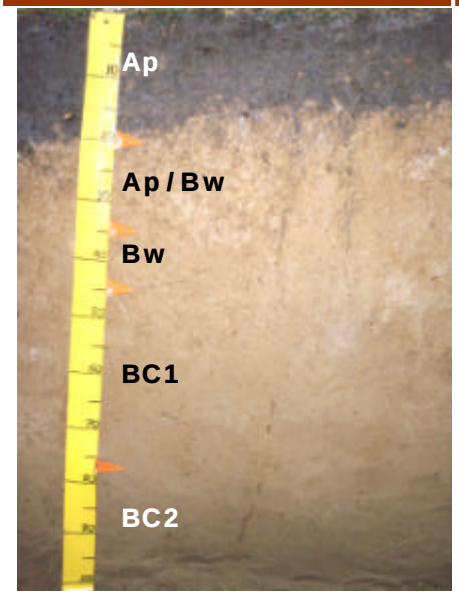
Similar soils

Some soils that have similar properties to Rosemarkie soils are:

- Otaraia: deep soil with acidic subsoils formed in loess, below 300m altitude
- Tokonui: deep soil that does not have acidic subsoils formed in loess, below 300m altitude

Typical profile features

The following is a 'generic' or composite profile description representing the most common combination of characteristics for this soil type. The actual profiles for which descriptions and data are available are listed at the end of this Technical Data Sheet.

Rosemarkie profile	Horizon	Depth (cm)	Description
	Ap	0–23	Dark brown silty clay; weak soil strength; strongly developed fine blocky structure; many roots.
	Ap/Bw	23–34	Yellowish brown silty clay; abundant wormcasts; weak soil strength; moderately developed fine blocky and polyhedral structure; few roots.
	Bw	34–44	Yellowish brown silty clay; weak soil strength; weakly developed very fine blocky structure; few roots.
	BC1	44–77	Yellowish brown silt loam; weak soil strength; weakly developed fine blocky structure; no roots.
	BC2	77–90+	Yellowish brown silt loam; weak soil strength; weakly developed coarse blocky breaking to very fine blocky structure; no roots.

Key profile features

Rosemarkie topsoils are about 20–25cm deep and have a strongly developed fine structure. Subsoil structure is weakly developed.

Typical physical properties

Note: values in Italics are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ap	0–23	Low	*Moderate*	Silty clay	Gravel free
Ap/Bw	23–34	Low – Moderate	*Moderate*	Silty clay	Gravel free
Bw	34–44	Moderate	*Moderate*	Silty clay	Gravel free
BC1	44–77	Moderate	*Moderate*	Silt loam	Gravel free
BC2	77–90+	Moderate	*Moderate*	Silt loam	Gravel free

Profile drainage: Well
Plant readily available water: *High*
Potential rooting depth: Deep
Rooting restriction: No major restriction

Key physical properties

Rosemarkie soils have a deep rooting depth and high plant available water content. Aeration and permeability is good, with minimal limitation down the profile. Texture is silty clay in the topsoil grading to silt loam in the subsoil. Topsoil clay content is about 35–40%. Soils are stonefree.

Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap	0–23	Low	High	High	Very low	Very low	Low	Very low	Low
Ap/Bw	23–34	Low	High	Moderate	Very low	Very low	Very low	Very low	Low
Bw	34–44	Low	High	Moderate	Very low	Very low	Very low	Very low	Low
BC1	44–77	Low	High	Moderate	Very low	Very low	Very low	Very low	Low
BC2	77–90+	Low	High	Moderate	Very low	Very low	Very low	Very low	Low

Additional chemical properties (as a profile average)
Reserve potassium (Kc) values are low; sulphate sulphur values are moderate and increase to high values in the deepest horizon.

Key chemical properties

Topsoil organic matter content is about 15%, P-retention values >80% and pH low (<5.0). Cation exchange values are moderate and base saturation low. Available calcium, magnesium and potassium levels are all low. Soil reserve phosphorus is also low. Micronutrient levels are variable. Molybdenum responses in legumes can be expected. Cobalt supplementation of sheep and copper supplementation of cattle and deer are likely to be required.

Vulnerability to environmental degradation

Note: the vulnerability ratings given in the table below are generalised and should not be taken as absolutes for this soil type in all situations. The actual risk depends on the environmental and management conditions prevailing at a particular place and time. Specialist advice should be sought before making management decisions that may have environmental impacts. Where vulnerability ratings of Moderate to Very severe are indicated, advice may be sought from Environment Southland or a farm management consultant.

Vulnerability factor	Rating	Vulnerability compared to other Southland soils
Structural compaction	minimal	These soils have a minimal vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the good drainage, with high clay, P-retention and organic matter content.
Nutrient leaching	moderate	These soils have a moderate vulnerability to leaching to groundwater. This rating reflects the good drainage and permeability that is offset by high water-holding capacity.
Topsoil erodibility by water	minimal	Due to the high clay and organic matter content, topsoil erodibility in these soils is minimal. Erodibility is highly dependent on management, particularly when there is no vegetation cover.
Organic matter loss	minimal	Vulnerability to long-term decline in soil organic matter levels is partly dependent on soil properties and highly dependent on management practices (e.g., crop residue management and cultivation practices).
Waterlogging	slight	These soils have a slight vulnerability to waterlogging during wet periods. This rating reflects the good drainage and permeability.

General landuse versatility ratings for Rosemarkie soils

Note: The versatility ratings in the table below are indicative of the major limitations for semi-intensive to intensive landuse. These ratings differ from those used in the past in that sustainability factors are incorporated in the classification.

Refer to the Topoclimate district soil map or property soil map to determine which of the soil symbols listed below are applicable, then check the versatility ratings for that symbol in the appropriate table.

RoR1 (Rosemarkie rolling deep)

Versatility evaluation for soil RoR1		
Landuse	**Versatility rating**	**Main limitation**
Non-arable horticulture	Moderate	Rolling slopes
Arable	Limited	Rolling slopes
Intensive pasture	Moderate	Vulnerability to leaching to groundwater
Forestry	High	No significant limitation

RoH1 (Rosemarkie hilly deep)

Versatility evaluation for soil RoH1		
Landuse	**Versatility rating**	**Main limitation**
Non-arable horticulture	Unsuitable	Hilly slopes
Arable	Unsuitable	Hilly slopes
Intensive pasture	Limited	Hilly slopes
Forestry	Moderate	Hilly slopes

Management practices that may improve soil versatility

- Management of nutrient applications so as to minimise leaching losses.

Soil profiles available for Rosemarkie soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
RoR1	K979	42	✓	✓	✓	

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Crops for Southland
PO Box 1306, Invercargill. New Zealand

www.cropssouthland.co.nz